

Coal Creek Bridge
Carrying Illinois Route 97
Over Coal Creek
Fairview Vicinity
Fairview Township
Fulton County
Illinois

HAER No. IL-125

HAER
ILL
29-FAIR.V,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Denver, Colorado 80225-0287

HISTORIC AMERICAN ENGINEERING RECORD
COAL CREEK BRIDGE
HAER No. IL-125

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I. INTRODUCTION

Present Location: Illinois Route 97
Spanning Coal Creek
Two miles north of Fairview, Illinois

USGS Quadrangle: Fairview, Illinois
Latitude 40°-40.40'; Longitude 90°-09.87'
UTM 15.739680.4506090

Inventory Data: State Aid Route 1
Section 23-C; Station 445+35
Illinois Structure No. 029-0031
SW 1/4 of Sec 16, T8N, R2E
Fulton County

Date of Construction: 1936, Bridge Name Plate

Owner, Custodian: Illinois Department of Transportation (IDOT)

Present Use: Vehicular bridge programmed for replacement
in FY 1995

Significance: The Warren pony truss with verticals is unusual in Illinois and one of three identified rolled Warren pony trusses built after 1927.

Historian: John B. Nolan, S.E.
3 April 1995

II. HISTORY

Coal Creek is a small tributary of Spoon River in west central Illinois, flowing westwardly through the northern townships of Fulton County to join the Spoon some seven miles distant. The valley, narrow with openly wooded pasture or limited cultivation, is bordered by rolling earth bluffs, about fifty feet high, and intersected by deep rolling ravines. Topography of the upland plateau, averaging fifty feet higher, has often been disturbed by extensive but reclaimed strip mining for several miles. Mining, hunting preserve and landfill properties, and roads adjacent to Illinois Highway 97 are often fenced and posted.

The earliest Euro-American settlers, principally from New Jersey, arrived in 1829 and settled a few miles north of Fairview and Coal Creek. County histories report that the first of these settlers, Mathias Sweezle, was an eccentric individual, who served as first justice of the peace, built a wooden cannon for the Black Hawk War, weighed 340 pounds and moved on to Oregon in 1849. Settlers found outcroppings of coal seams on the surface and opened drift mines for personal use. An early coal business was formed in 1848 and extensive operations were undertaken after 1865. Coal Creek, called Turkey Creek on the earliest map, was renamed after 1831. In 1965 Fulton County was the leading coal producing county in Illinois.¹

A grist and saw mill built on Coal Creek in 1837, just west of the present bridge on Highway 97, was known as Hamey's Mill or "Corn-cracker." An 1871 Atlas shows a road along the future highway location. Later ownership maps show the same location with minor deviations around the creek crossing. In 1912 the road is identified as a mail route.²

The earliest mail between Monmouth, Knoxville and Springfield was carried over this road each week by the fifteen year old son of the Lewiston postmaster, Major Ross, who had recommended Abraham Lincoln for postmaster in the village of New Salem, a stop on the route. Fairview village, formerly Fair View, was established at the crossing of the mail trail and an ancient Indian trail between the Illinois and Mississippi Rivers.³

County Supervisors meeting in March, 1917, accepted a petition for a bridge over Coal Creek, believed to be at this location, for an estimated cost of \$1700, but further details are unreported. Annual highway reports in the 1930's give no record of the date when the road north of Fairview was incorporated into the Federal Aid system. Illinois highway maps show a dirt road along that alignment in 1932 and, in 1937, the route is designated Illinois Route 168 (now Route 97) and is under contract for paving.⁴

The existing bridge, now programmed for replacement, was built in 1936 at a location 65' downstream from an earlier steel truss bridge having a 60' length and 14' roadway width. The 1936 contractor was to remove

the older truss. There is no visible evidence of the older structure.

The Warren trusses with rolled beam members used in the Coal Creek Bridge are typical of those used in the Federally funded accelerated road building programs developed during the 1930s to counter the effects of the Great Depression. Included in those programs were emergency grants, the National Recovery Act (N.R.A.) and the Public Works Administration (P.W.A.).⁵

III. THE BRIDGE

A. The Bridge Type

The Coal Creek Bridge is a single span Pony Warren Truss with verticals. Into the mid-1930s metal trusses were the accepted and popular bridge type to use for single spans where maximum clearance above high water was needed. The 5" middle ordinate length of the roadway alignment curve is split for the truss center line. The trusses have been spread 3-1/2" in order to accommodate the curved and superelevated deck. The bridge itself crosses Coal Creek at right angles.

The development of trusses of wrought iron in the first half of the nineteenth century and, later, steel in the second half of the century contributed to the rapid expansion of railroads and eventually roads. For local road crossings of small streams low, or pony, Pratt trusses with pinned connections were the practical and cost effective solution. Members of early trusses could be assembled with rivets in one of the hundreds of small fabrication shops, transported to the site by railroads and wagons and erected by a crew of local laborers under the direction of a foreman from the manufacturer's company. There were few standards, and many companies developed and patented designs which allowed them to build unique, if not better, bridges.⁶

By the turn of the century, national quality standards were being developed and many smaller bridge companies had ceased operations or merged into larger companies, principally the American Bridge Company. The erection of smaller bridges was handled by independent contractors who would order prefabricated bridge components from steel fabricators. A report of the Illinois Commission in 1906 encouraged uniformity in design and development of experienced contractors.⁷

The early lightweight pony Pratts with pinned connections and outrigger braces had been simple to erect but lacked strength and lateral stability. Many were washed out, failed or were replaced as highways were improved and traffic weights increased following World War I.

The Warren Truss, basically a series of isosceles triangles, and patented in Britian in 1848, is an improved version of a design patented in France in 1838. Stress analysis and design of Warren trusses may be more sophisticated than the Pratt and generally provide greater economy in the use of materials. Warrens with pinned connections had not been accepted in America but the type became a favorite after fixed joint connections replaced pins. Helped by the development of portable pneumatic riveters or improved bolts, Warrens, with field assembled connections using bolts or rivets, replaced pinned Pratts during the first quarter of the century and since that time have been the preferred choice for spans up to 140' where a low truss bridge is required.⁸

Design plans developed as early as the 1920s by the bridge section of the Division of Highways used fully riveted Warren Trusses for spans up to 130'. In this structure, as in the majority of highway bridges, the basic Warren Truss triangular panels are subdivided with vertical members to reduce the unsupported lengths of upper and lower chords.

A later improvement in truss fabrication was the adoption of rolled steel beams for chord members, replacing the workable but labor intensive assemblies of angles, channels, plates and lacing. The first Illinois standard bridge drawing utilizing rolled beams as truss members appeared in 1935. The Coal Creek Bridge, having rolled beams as truss members, is an widened version of Standard No. 1698. There are two other Warrens of the type on the Illinois Historic Bridge Survey list.⁹

Design plans for this bridge were developed in the Bridge Section of the Division of Highways. Designers signing the superstructure plans are P. L. Dahlquist and R. B. Murphy. The substructure designer was J. N. DuVernet. Plans are dated December 16, 1935. Construction was completed in 1936.¹⁰

Substructure contractor was Joyce Brothers Construction Company of Springfield, for \$11,872; Superstructure contractor was Michelmann Steel Company of Quincy, for \$8,230.47.¹¹

After World War II, due to the accelerated need for wider roadways, stronger bridges and improved alignments, the narrow, short span pony trusses became obsolete and have been gradually replaced, frequently with multi-beam deck structures with beams of steel or concrete. Only a few trusses would be built in the future.

B. The Builders

Michelmann Steel Company, the superstructure contractor, was founded in 1865 by John H. Michelmann as the Michelmann Boiler Company. About 1900 the name was changed to Michelmann Steel Construction Company and its products became fabricated steel products for

bridges and buildings. Michelmann's has been continuously family managed since 1865; the fifth generation is now actively engaged in the operations of the company. The original company has expanded into several structural firms, Tri-State Steel Erectors, Mid-State Door and Hardware, and MICO Engineering, Inc., Civil/structural consulting engineers.¹²

The substructure contractor was Joyce Brothers Construction Company of Springfield, Illinois.

Thomas H. Joyce, Jr., residence and business at 1516 Noble Ave. in Springfield, is listed in the City Directory of 1935 as a road contractor. The 1939 Directory lists Thomas' occupation as Joyce Brothers Construction Co. In 1940 the firm is listed as Joyce Brothers Contracting Company, with officers Thomas H. Joyce, Jr., president and treasurer; James J. Joyce, vice president; H. H. Joyce, secretary; Office in the Meyers Building. Joseph Joyce, possibly another brother, is a Jr. Engineer with the State Highway Department. In 1942-3 Thomas is listed as president of the company with offices in the Meyers building. The company was never incorporated and is not listed in Sangamon County records.¹³

A brief obituary from Key Biscayne, Florida, announced the death of Thomas H. Joyce, Jr. on November 23, 1972. He was identified as a former president of Cameron-Jones Construction Co., having retired in 1958.¹⁴

C. The Structure Description

Single span, pony Warren truss with verticals.¹⁵
Design loading, H 15 + impact.
Allowable steel unit stress, presumed A-7, 18,000 psi.

Truss length 90'-0", six (6) panels 15'-0" long.
Distance center to center of trusses 26'-10 1/2"
Height between upper and lower chord centers 11'-0".
Clear roadway width 24'-0".
Truss members are symmetrical about the U3-L3 vertical.

Upper chords:

U1-U3-U6 10" WF 54 lbs.

End posts:

L0-U1 10" WF 49 lbs.

Lower chords:

L0-L2 10" WF 33 lbs.

L2-L4 10" WF 54 lbs.

Diagonals:

All 10" WF 33 lbs.

Verticals:

U1-L1, U3-L3 10" WF 45 lbs.

U2-L2 10" WF 33 lbs.

Floor beams:

End, L0 27" WF 91 lbs.

Interior, L1, L2, L3 27" WF 98 lbs.

Ends of floor beams have standard web connection angles added in shop, 22 rivets in single shear; framed into lower chords and verticals with field rivets.

Stringers:

Five rolled beams at 6'-0" centers,

Exterior: 14" WF 30 lbs.

Interior: 16" WF 40 lbs.

Framed into floor beams with seat and web angles, upper flange cropped, set to slope of deck super elevation.

Bottom lateral cross-bracing:

L0-L1-L2, single angles 3-1/2"x5"x5/16" with center gusset, 3/4" plate; L2-L3-L4, single angles 3-1/2"x3" x 5/16" hangers at L1 and L3, angle and 3/8" plate to stringers S2 and S4;

Lower chord connections at L0 and L2, piece 24" WF 74 lbs.

Bearings:

Two cast iron rockers, north end, 3-3/4" pins;

Two cast iron bolsters, south end, 3-3/4" pins.

Plate Gussets:

L0, connection/end beam support 1/2" plate

U1, L2, U3 connection 7/16" "

L1, L3, L.C. hanger connection 7/16" " O.S.; 3/8" I.S.

U2, U.C. support connection 3/8" " .

Rivets:

3/4", shop and field.

Concrete Deck:

6-1/2" thick, reinforcement top and bottom, S.E. .029'/'

integral 6"x8" high curbs,

4"x6" C.I. drains, 22" long, sloped to inside of stringers.

Railing:

Ship channels 6"x15.3 lbs., 1"-11" and 3'-6" to top.

Connection angles with variable horizontal leg lengths

provide for horizontal curvature of rail from 4" to 8-1/4" clear of truss edge.

Stanchion posts, 10", support curved rail ends at L0 deck ends.

Substructure:

Concrete abutments are of closed type construction, incorporating corner columns to support the end bearings, a longitudinal top beam, beveled front wall, 14'-8-3/8" minimum height (0.27' grade); 20'-6 1/4" wing wall length at 45°; 2'-0" footings on untreated timber piles driven to capacities of 10, 15 and 18 tons in sand and gravel and blue clay. Reinforcement bars are both square and round.

II. D. Present Condition and Modification

The bridge has been adequately maintained and although reasonably sound is in a deteriorating condition. It is marginally adequate for present loading, but the 24'-0" roadway width does not meet current minimum standards for a state highway. It is posted one truck at a time.

In 1976 IDOT Central Bridge Maintenance personnel strengthened all top chords with additional web plates, 7-1/2"x1/2" bolted top and bottom; end posts were strengthened with single web plates, 7-1/2"x1/2" bolted on top. The same contract included replacement of three curb stringers on the east edge, the addition of steel plate beam guard rails bolted to the lower rail elements and replacement of the deck. The new deck, 25'-0" wide, has no curbs, the original deck width was 24'-0" between 6"x8" sloped curbs.¹⁶

Due to the deteriorated web condition of the southernmost interior floor beam, timber blocking was added and a supporting floor beam was placed below the original in September 1992 by Bridge Maintenance personnel.

E. Ownership and Future

The Coal Creek Bridge is owned by the Illinois Department of Transportation and maintained by District Four of the Department. Due to the narrow roadway, deteriorated member condition and marginal load carrying capacity, a replacement of this structure is scheduled for the immediate future.

Although the use of rolled beams for truss members represents a noteworthy and final development in short span truss building, the bridge has minimal value for preservation.

The bridge will be dismantled by the contractor and stored at the site pending possible reuse. If the salvaged trusses are not reused or donated after six months the contract provides for the contractor to dispose of the bridge.¹⁷

IV. END NOTES

¹Helen Hollandsworth Clark, ed., A History of Fulton County, Illinois, in Spoon River Country, 1918-1968. (Astoria, Stevens Publishing Co., 1969) pp 130.; Sectional Map of Fulton Co. Illinois, Canton, W.H. Haskell, engraver, 1851.

²A History etc., p 14; Atlas Map of Fulton County, Illinois. (Davenport, Iowa: Andres, Lyter and Co.).

³John Drury, This is Fulton County, Illinois. (Chicago, The Loree Co., 1954) p 8.

⁴Proceedings of the Fulton County Board of Supervisors Meeting, Lewistown Evening Record. (Lewistown) March 13, 1917, 1; Annual Reports of the Division of Highways. (Springfield: Department of Public Works and Buildings, 1934, 1935, 1936); Official Map of Illinois Highways. (Springfield: Department of Public Works and Buildings, 1924, 1932, 1935, 1937).

⁵Annual Reports etc., 1934 p 16ff, 1935 p 16ff, 1938 p 12ff.

⁶David Plowden, Bridges: The Spans of North America. (New York: Viking Press, 1974) pp 62, 67

⁷Victor C. Darnell, Directory of American Bridge Building Companies, 1840-1890. (Washington, D.C.: Society for Industrial Archaeology, 1984), pp Introduction, 13; Illinois Highway Commission Report. (Springfield: State of Illinois, 1906) p 55ff.

⁸Milo S. Ketchum, C.E. Structural Engineers Handbook. (Chicago: McGraw-Hill, 1924), pp. 140, 676, others; James L. Cooper, Iron Monuments to Distant Posterity, Indiana's Metal Bridges, 1870-1930. (DePauw University and others, 1987), pp 84ff; David Plowden, p 185.

⁹Illinois Department of Transportation, Historic Bridge Survey List. (Springfield, Illinois: Bureau of Location and Environment, 1992), p 3103M.PW.

¹⁰Bridge Plans, Coal Creek, S.A. Rt. 1, Section 23C, Fulton County, Station 445+35; S.N. 029-0031. (Springfield: Division of Highways, Department of Public Works and Buildings, State of Illinois, 1935) 3 sheets.

¹¹Conversation: Rex E. Livingston, Supervising Field Engineer, IDOT District 4, Peoria, March 28, 1995.

¹²Conversation: William F. Gerdes III, P.E., President Michelmann Steel Co., Quincy, March 28, 1995; Supplementary faxed data.

¹³City Directories, Springfield and Sangamon County. (Springfield, Williamson Printing and Publishing Co. and others, 1935 through 1940); Illinois Corporation archives and Sangamon County County Clerk have no record of this company.

¹⁴Obituaries, Illinois State Journal. (Springfield: November 24, 1972) p 44. (Obituary of Thomas H. Joyce, Jr.)

¹⁵Bridge Plans, Coal Creek....Section 23C.

¹⁶Bridge Repairs Over Coal Creek....Section 23BC. (Springfield: Illinois Department of Transportation, Bureau of Design, Bridge Office plans for IDOT Central Bridge Maintenance repairs, 1976).

¹⁷Conversation: Rex E. Livingston, March 28, 1995.

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published by a branch of the Smithsonian Institution.)

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Chicago: McGraw-Hill, 1924. (An early classic on bridge
design practices, originally published in 1908.)

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B. Maps

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C. Bridge Plans

Coal Creek, S.A. Rte. 1, Section 23-C, Fulton County, Station 445+35. (S.N. 029-0031) Division of Highways, Department of Public Works and Buildings, State of Illinois, 1935, 3 sheets.

Bridge Repairs over Coal Creek, F.A. 137 (S.A. 1), Section 23 BC, Fulton County, Station 445+35. (S.N. 029-0031) Illinois Department of Transportation, Bureau of Design, Bridge Office, 1976, 3 sheets.

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E. Reports

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Illinois Highway Commission Report, Springfield: State of Illinois, 1906.

F. Conversations

Gerdes, William F. III, P.E., President,
Michelmann Steel Company
(137 North Second Street)
P.O. Box 609
Quincy, Illinois 62308-0609
Telephone 217/222-0555. 28 March 1995

Helle, Robert, Assistant County Engineer
(For Robert E. Pedigo, County Superintendent)
Fulton County Highway Office
430 East Oak Street
Canton, Illinois 61520-3155
Telephone 309/647-0351. 28 March 1995

Livingston, Rex E., Supervising Field Engineer
IDOT District 4
401 Main Street
Peoria, Illinois 61602
Telephone 309/671-3656. 28 March 1995

G. Data Depositories

Illinois Department of Transportation Library
2300 South Dirksen Parkway, Springfield
(Division of Highways historical data.)

Illinois State Archives,
Capitol Complex, Springfield.
(County histories, business records.)

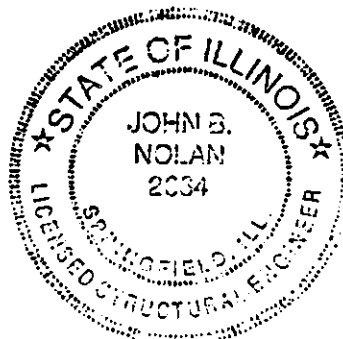
Illinois State Historical Library,
Old Capitol Plaza, Springfield.
(County histories, newspaper microfilms.)

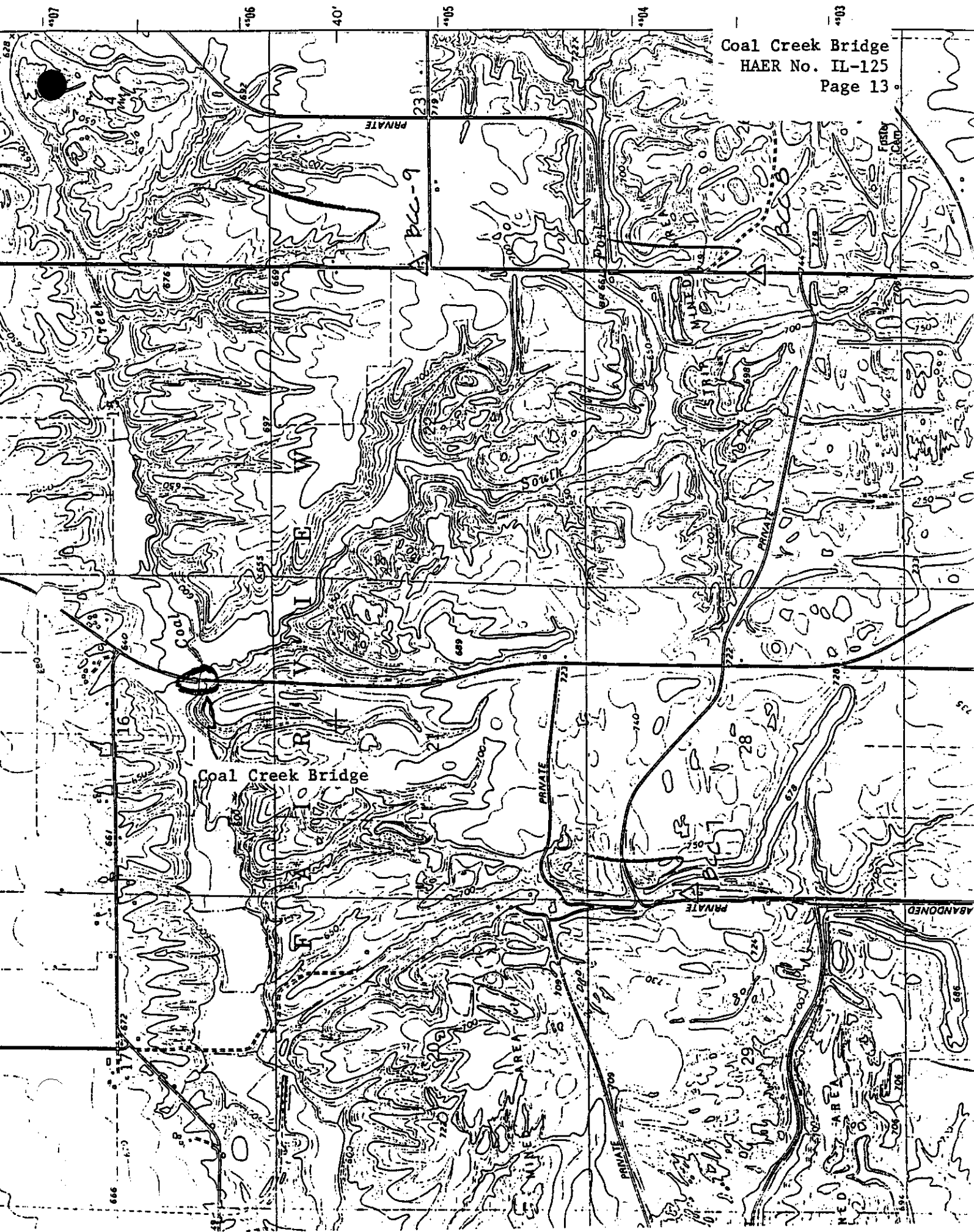
Parlin-Ingersoll Library,
205 West Chestnut Street,
Canton, Illinois 61520.
(Fulton County historical data.)

Report prepared by:

John B. Nolan, S.E.
66 Circle Drive
Springfield, IL 62703-4805
217/529-1550

3 April 1995





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